

Mapping & Geographic Information

MISSION

The mission of the Office is to improve the efficiency and effectiveness of Loudoun County Government by providing core services on the County's Geographic Information System that ensure current and accurate land-related information for County government agencies and the County's residents and businesses.

DESCRIPTION

The Office of Mapping and Geographic Information develops, maintains, analyzes, and distributes Loudoun County's land based (mapped) information. The System Development and Support staff maintains the Geographic Information System (GIS) software and ensures that the system's users have access to the information and the tools they need to accomplish their work. Land Records Development and Analysis staff compiles new data as needed by County agencies and provides analyses and maps to assist the County in formulating policies and managing programs. Land Records Maintenance staff develops and maps new addresses, streets, and parcels on an hourly basis and transmits these and other data to Land Management Information System (LMIS), E-911, and other databases. Public Information staff assists citizens and businesses at the office's public counter and responds to requests for maps and spatial data. The LMIS Steering Committee provides general direction for the office's programs.

BUDGET OVERVIEW

FY 07 Issues, Challenges & Trends:

- The workload for parcel, address, and street centerline data maintenance remains very high. Because the land records maintenance process on the GIS is the foundation for much of the County's information management, the creation and transmission of the data must be timely and accurate.
- As GIS supports a growing number of systems and processes (the mapping component of Computer Aided Dispatch
 was added in FY 2006), there has been a renewed focus on efforts to maintain and improve the quality of the data.
 Regular reporting of data quality as well as quantity will continue to be programmed into maintenance processes.
- Web mapping has become vital to many of the County's citizens and businesses, and changes in GIS technology have allowed for improvements in Web based services. A major challenge in the next year will be to begin re-platforming and expanding upon Web based GIS services, though success will be dependent upon the office's ability to attract and retain qualified talent.
- A major issue regionally in Northern Virginia and the Washington Metropolitan area is the coordination of GIS data for
 public safety to support Computer Aided Dispatch (CAD) and other applications. Together with DIT, the office will
 continue to support those efforts in FY 07 to make regional data available to Loudoun for emergency dispatching and
 management using web based technology.
- Successful web based data sharing requires complete data documentation in the form of metadata. A challenge in FY
 07 will be to update the County's metadata to support the regional and statewide efforts.

FY 07 Major Goals:

- The primary focus will be on continuing to apply the new tools of the upgraded GIS to improve data maintenance processes, quality control, reporting, and web based distribution of spatial data.
- Another major goal will be to improve data collection and maintenance of street centerline attributes for the Automatic Vehicle Locator (AVL) system, E-911 dispatching, and other applications.
- The office will focus on the completion of metadata to facilitate public safety data sharing and to maintain the data, processes, and programs that support Land Management Information System (LMIS), AVL, CAD and the Web.

FY 06 Major Achievements:

- Parcel, address, and street centerline data maintenance was implemented in the new Spatial Database Engine (SDE).
- Project tracking and time management were implemented in the land records data maintenance processes.
- The office began collecting additional attribute data for the street centerline database to support AVL for public safety.
- The office implemented a new base map maintenance process that refreshes the planimetric and topographic data countywide for the first time while lowering costs.

Mapping & Geographic Information

Department Financial Summary

Departmental Financial	FY 03	FY 04	FY 05	FY 06	FY 07
Summary	Actual	Actual	Actual	Adopted	Adopted
Expenditures					
Personnel	\$1,387,583	\$1,514,230	\$1,483,803	\$1,636,000	\$1,771,000
Operations & Maintenance	230,062	293,732	334,607	166,000	225,000
Capital Outlay	0	0	5,898	0	0
Total Expenditures:	\$1,617,645	\$1,807,962	\$1,824,308	\$1,802,000	\$1,996,000
Revenue					
Local Fees, Charges, Etc.	\$62,050	\$63,190	\$83,948	\$71,000	\$69,000
Total Revenue:	\$62,050	\$63,190	\$83,948	\$71,000	\$69,000
Public Safety Communications Fund:	\$0	\$0	\$68,966	\$59,000	\$64,000
Local Tax Funding:	\$1,555,595	\$1,744,772	\$1,671,394	\$1,672,000	\$1,863,000
FTE Summary:	24.80	24.80	23.80	23.80	23.80

FY 07 Board Action: The FY 07 Adopted Fiscal Plan for the Office of Mapping and Geographic Information provides services at the County Administrator's recommended level. Local Tax Funding increases by \$29,000 for temporary employees and \$56,000 for increased data processing costs. The FY 07 Budget also includes funding for the implementation of compensation increases and increased benefits costs effective September 2006.

Budget History:

FY 03: A 1.00 FTE addressing technician was eliminated.

 $\underline{\text{FY }04\text{ Mid-Year}}$: The Board eliminated the Purchase of Development Rights (PDR) Program Administration, including 2.00 FTE.

FY 05: The Board added 1.00 FTE for a public safety data specialist in the Public Safety Communications Fund.

Mapping and Geographic Information

Expenditures by Program

		FY 03	FY 04	FY 05	FY 06	FY 07
Programs		Actual	Actual	Actual	Adopted	Adopted
System Development and Support		\$666,768	\$760,267	\$786,690	\$619,000	\$606,000
Land Records Maintenance		315,261	391,261	381,702	435,000	670,000
Land Record Development and Analysis		385,886	404,264	401,936	486,000	439,000
Public Information		249,730	252,170	253,980	262,000	281,000
	Total	\$1,617,645	\$1,807,962	\$1,824,308	\$1,802,000	\$1,996,000

Revenues by Program

Programs		FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
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System Development and Support		\$0	\$0	\$0	\$0	\$0
Land Records Maintenance		0	0	68,966	59,000	64,000
Land Record Development and Analysis		0	0	0	0	0
Public Information		62,050	63,190	83,948	71,000	69,000
	Total	\$62,050	\$63,190	\$152,914	\$130,000	\$133,000

Local Tax Funding by Program

Programs		FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
System Development and Support		\$666,768	\$760,267	\$786,690	\$619,000	\$606,000
Land Records Maintenance		315,261	391,261	312,736	376,000	606,000
Land Record Development and Analysis		385,886	404,264	401,936	486,000	439,000
Public Information		187,680	188,980	170,032	191,000	212,000
	Total	\$1 555 595	\$1 744 772	\$1 671 394	\$1,672,000	\$1.863.000

Staffing by Program

Programs	FY 03 Actual	-			FY 07 Adopted
System Development and Support	7.40	7.40	5.40	5.40	7.20
Land Records Maintenance	6.20	6.20	7.20	7.20	7.20
Land Record Development and Analysis	7.30	7.30	7.30	7.30	6.30
Public Information	3.90	3.90	3.90	3.90	3.10
Tota	1 24.80	24.80	23.80	23.80	23.80

Mapping & Geographic Information – System Development and Support Program

DESCRIPTION

The System Development and Support Program has provided the critical services and products that support all of the functions of the GIS since the system was installed in 1986. The program provides data management and application development and support services that permit the other functions of GIS (data development, data maintenance, data distribution, and data analysis) to be performed. Data management includes the maintenance of directory structures and security on the GIS server. Data are routinely monitored for integrity and documentation. Application development is undertaken to automate operations in other departments and to support data maintenance, distribution, analysis, and management. Tasks involved include the analysis of existing business practices, programming, testing, training of staff, and documentation of programs and processes. Applications, once developed, must be maintained as data, programs, systems, requirements, and staff change. Applications that support data maintenance began in 1987 when the programs and processes that create addresses were developed. The basic programs that maintain parcel data were designed in 1993 and modified in 1999 to transfer data to the Land Management Information System (LMIS). The program supports data distribution through the development and maintenance of programming on the web servers and assists in complex data analysis tasks. The program manages the contracts that maintain the most important of the County's core GIS data, the base map. All of the other mapped layers are registered to this map maintained by the private sector.

BUDGET OVERVIEW

FY 07 Issues:

- The latest revisions to the GIS software are considerably more complex and require a greater level of expertise and training than has been the case in the past.
- Federal, state, and regional initiatives to share spatial data for public safety using web based tools are likely to increase
 in scope and complexity.

FY 07 Challenges:

- The department has many new challenges this year. The first challenge will be in applying new tools from the upgraded GIS to improve data maintenance processes, quality control, reporting, and distribution of spatial data.
- Maintaining quality data, including the development of automated checks and reporting, to provide efficient service delivery is the second challenge.
- The department will work to improve data distribution, both internally and externally, with the County's business partners.
- Finally, revising the County's metadata to meet national standards is an ongoing challenge for the department.

Program Financial Summary	FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
Expenditures					
Personnel	\$500,277	\$526,855	\$492,107	\$527,000	\$455,000
Operations & Maintenance	166,491	233,412	288,685	92,000	151,000
Capital Outlay	0	0	5,898	0	0
Total Expenditures:	\$666,768	\$760,267	\$786,690	\$619,000	\$606,000
Revenue					
Local Fees, Charges, Etc	\$0	<u>\$0</u>	\$0	<u>\$0</u>	<u>\$0</u>
Total Revenue:	*************************************	\$0	\$0	\$0	\$0
Local Tax Funding:	\$666,768	\$760,267	\$786,690	\$619,000	\$606,000
FTE Summary:	7.40	7.40	5.40	5.40	7.20

Mapping & Geographic Information – System Development and Support Program

Planned Accomplishments/Objectives for FY 07

Goal: Maintain the County's base map to a level that supports all other mapping on the GIS.

<u>Objective:</u> Meet the needs of E-911 and AVL for base map data by capturing 100% of all newly constructed features from annual aerial photography.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Newly constructed habitable buildings mapped annually	62%	60%	90%	90%
Newly constructed public roads mapped annually	28%	26%	95%	95%

Goal: Ensure that geospatial data and GIS functionality are accessible to all potential users under all circumstances.

<u>Objective:</u> Improve current web based mapping services by re-platforming the service and evaluating user needs.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Completion of re-platforming of web base mapping	N/A	N/A	10% 1	50%
Average internet external/intranet visits per day	904/105	874/124	807/131	850/135

Goal: Ensure that geospatial data and GIS functionality are accessible to all potential users under all circumstances.

Objective: Develop a web based data distribution service for public safety and other government agencies.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Completion of web based data distribution service	N/A	N/A	N/A ¹	100%
Number of visitors to the web data distribution service	N/A	N/A	N/A	75

¹Progress in FY 06 was delayed by an inability to fill the Web Analyst position for almost half of the fiscal year.

Mapping & Geographic Information – System Development and Support Program

Planned Accomplishments/Objectives for FY 07 - Continued

Goal: Develop and enforce quality assurance procedures for all data.

<u>**Objective:**</u> Develop uniform automated QC processes and weekly automated reporting of status and activity for all Loudoun County GIS corporate data.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Layers with metadata	50%	23%1	31%	46%
Attribute coding that is in error	N/A	N/A	N/A	5%
Dynamic data sets that are maintained on schedule	N/A	N/A	97%	99%
Completion of automated reporting of status and activity	N/A	N/A	3%	60%

¹Upgraded from previous standard and reflects SDE and NAD83 conversion.

<u>Goal:</u> All geospatial data on the GIS will be created, maintained, and documented to meet or exceed accepted national, state, or county standards as appropriate to support county business practices.

<u>Objective:</u> Design data maintenance processes in Spatial Database Engine (SDE) that support county business practices.

Performance Measures	Actual	Actual	Est.	Proj.
	FY 04	FY 05	FY 06	FY 07
Number of data sets maintained in SDE	N/A	N/A	7	110

Mapping & Geographic Information – Land Records Maintenance Program

DESCRIPTION

Parcels, addresses, and street centerlines are core land records databases used to reference and link nearly all of the County's information resources. Most of the County's services are provided to and information is consequently stored for buildings with addresses or for parcels. Since parcels are always changing, buildings are routinely built and demolished, and new streets constructed, these core services and databases must be constantly maintained.

The data maintenance process is usually part of the subdivision process and begins when the division enforces Chapter 1020 of the County Code by working closely with developers to name new streets. At the subdivision approval stage, surveys are normally delivered electronically from private sector surveying and engineering firms, and the parcel data is incorporated into the County's parcel layer at recordation. The street centerlines are used to assign addresses according to Chapter 1026 (Addressing of Premises) of the County Code, ensuring that addresses are unique and accurate.

Upon recordation, each new parcel is overlaid on 21 other mapped layers and a database is compiled that documents the amount of floodplain, type of zoning, etc. A similar process occurs in addressing which compiles the full address including the zip code. These two databases are then transferred to the Land Management Information System (LMIS), managed by the Department of Information Technology, where they are used in the issuance of building permits. LMIS transfers the data to the County's Computer Aided Mass Appraisal (CAMA) system. The street centerline mapped database and the addresses are delivered to Fire and Rescue Services for processing and incorporation into Computer Aided Dispatch (CAD).

BUDGET OVERVIEW

FY 07 Issues:

Critical issues for this program are the ability to retain qualified technical staff and to ensure a timely and accurate
product. Workload is very high, and the data products are tightly integrated with CAD, assessments, building permits,
and other functions.

FY 07 Challenges:

- Because so many other programs and services, including building permits and E-911, rely on the prompt and accurate
 creation and transmittal of these data sets, the data maintenance processes must be constant, fast, and accurate.
 Improvements to the GIS software are permitting the program to continue to improve the data maintenance and quality
 control processes so as to better support LMIS and other systems.
- Another major challenge will be to adapt data models to coordinate database structures with surrounding counties and the State, while continuing to maintain support for CAD.
- There will be further integration of GIS with E-911 and the Automatic Vehicle Locator (AVL) module of the County's 911 dispatching system.

Program Financial Summary	FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
Expenditures					
Personnel	\$305,004	\$378,615	\$371,062	\$412,000	\$646,000
Operations & Maintenance	10,257	12,644	10,640	23,000	24,000
Total Expenditures:	\$315,261	\$391,259	\$381,702	\$435,000	\$670,000
Public Safety Communications Fund:	\$0	\$0	\$68,966	\$59,000	\$64,000
Local Tax Funding:	\$315,261	\$391,259	\$312,736	\$376,000	\$606,000
FTE Summary:	6.20	6.20	7.20	7.20	7.20

Mapping & Geographic Information - Land Records Maintenance Program

Planned Accomplishments/Objectives for FY 07

<u>Goal:</u> All geospatial data on the GIS will be created, maintained, and documented to meet or exceed accepted national, state, or county standards to support County business practices.

Objective: Maintain parcel, address, and street data to a level that supports E-911, LMIS, and AVL.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of record plats and site plans addressed/addresses	120/5,710	160/6,250	160/6,300	180/7,020
Number of plats mapped and transferred to LMIS	519	496	560	570
Number of miles of new public roads added to the database	N/A	151	105	115
Number of centerline attributes maintained to a level that supports AVL/ number of attributes needed.	N/A	N/A	6/6	6/6

Goal: Coordinate with other counties and state and federal agencies to improve data accessibility and functionality.

<u>Objective:</u> Adopt the Virginia data model for street centerline and maintain the Loudoun portion of the State's centerline.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of miles of street centerline transferred to the State	N/A	2,186	105	115
Number of miles of ancillary centerline data transferred to the State	N/A	N/A	N/A	139

Mapping & Geographic Information – Land Record Development and Analysis Program

DESCRIPTION

This program provides internal services on the GIS to other County agencies and the Board of Supervisors. These services are undertaken to either create or improve a process or service or to provide information for a policy or service delivery decision. The primary services of the program are data development, selected data maintenance, software tool development, data analysis, and training. Data development to improve services and answer policy questions began when the County purchased the GIS 1986 and continues today. A major goal of both the County's 1993 Strategic Plan for GIS and the 1995 Land Records Management Plan was the development and maintenance of core data to support the County's business practices. Staff in this program have developed most of the spatial data sets used by the County and its citizens on a daily basis. Data maintenance assistance is provided to County agencies that lack the resources or technical expertise to maintain spatial data. Software tool development assistance is provided to assist departments in maintaining or using spatial data in their service programs. Tools are developed through a process of consultation with the end user, programming, testing, and documentation. Data analysis produces information in the form of maps, tables, and graphs to assist the Board and County departments in decision making. The program provides training to County staff on understanding data, developing spatial queries, and using the GIS software.

BUDGET OVERVIEW

FY 07 Issues:

- As GIS is increasingly used to manage service delivery across the County, this program must respond across its full
 range of services including spatial modeling, training, and quality control of the base map. Strong project management
 has become increasingly important to ensure that the priority demands are met.
- The County must maintain competency in technology if it is to respond to advanced policy issues and to maintain existing programs.

FY 07 Challenges:

 The primary challenge will be to adapt new technology to support sophisticated data modeling, data development, and data maintenance.

Program Financial Summary	FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
Expenditures					
Personnel	\$373,836	\$391,370	\$392,911	\$465,000	\$416,000
Operations & Maintenance	12,050	12,892	9,025	20,000	23,000
Total Expenditures:	\$385,886	\$404,262	\$401,936	\$485,000	\$439,000
Local Tax Funding:	\$385,886	\$404,262	\$401,936	\$485,000	\$439,000
FTE Summary:	7.30	7.30	7.30	7.30	6.30

Mapping & Geographic Information Land Record Development and Analysis Program

Planned Accomplishments/Objectives for FY 07

<u>Goal:</u> All geospatial data on the GIS will be created, maintained, and documented to meet or exceed accepted national, State, or County standards as appropriate to support County business practices.

Objective: Maintain quality control of base map contract deliverables.

Performance Measures	Actual	Actual	Est.	Proj.
	FY 04	FY 05	FY 06	FY 07
Number of square miles of base map data reviewed for quality control	397	72	50	36^{1}

¹FY 04 reflects an update of a large portion of western Loudoun, while FY 05-06 involved eastern Loudoun. The FY 07 projection only anticipates capturing changes that have occurred in both areas since the last updates.

Goal: All geospatial data on the GIS will be created, maintained, and documented to meet or exceed accepted national, State, or County standards as appropriate to support County business practices.

<u>Objective:</u> Develop new data sets as needed and develop data maintenance processes that support County business practices.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of data layers developed	64	26	30	30
Number of data layers edited	9	128^{2}	21	20

²Increase is due to migration of data maintenance processes to the new server and data editing for quality control on the new system.

<u>Goal:</u> Provide all users and maintainers of geospatial data with sufficient skills and knowledge to access, use, and understand the information.

Objective: Develop and offer training on GIS tools for County staff.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of classes/ students	N/A	8/44	10/60	10/60
Average evaluation score out of seven	N/A	6.08/7	6.08/7	6.10/7

Mapping & Geographic Information Land Record Development and Analysis Program

Planned Accomplishments/Objectives for FY 07 - Continued

Goal: Support management decisions through analysis and communication of spatial data.

Objective: Develop maps, spatial models, and software tools that facilitate service delivery and policy decisions.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of maps/ spatial analyses developed	297/63 ³	145/9	150/50	175/50
Number of management, programs, or processes tools developed	1	21	30	30

³FY 04 actual reflects support for the PDR Program and zoning litigation.

Mapping & Geographic Information - Public Information Program

DESCRIPTION

The Public Information Program began in 1990 when the first GIS public access terminal was installed at the counter of the Department of Natural Resources. A part of the Administrative Division of the department at the time, the program was responsible for the sale of maps and for answering the public's land related questions. In FY 99, the program assumed responsibility for distributing not just maps but also GIS data in response to Freedom of Information Act requests. Today the program provides information and assistance to the public, the private sector, and other County agencies on a broad spectrum of land information. The office maintains a map and information review and sales counter, and provides responses to inquiries on properties and their characteristics (parcel boundaries, soils, floodplains, etc.). A large portion of the information and assistance provided is focused on helping the public comply with the floodplain and mountainside ordinances, zoning regulations, and other Community Development requirements. Staff routinely assists the public in researching and understanding the characteristics of land using GIS and the Land Management Information System (LMIS). Staff also plots maps, photocopies plats, and writes data to CD-ROM for sale to customers. This program is responsible for servicing the printers and plotters of the office, for most of the administrative functions, and for managing the County Store.

BUDGET OVERVIEW

FY 07 Issues:

• Besides meeting the daily demands for data and service, the greatest issue for this program is the public's level of knowledge of spatial data and the tools of GIS. The County's web based resources are not fully utilized by both public and the private sector customers because of this lack of understanding.

FY 07 Challenges:

 The primary challenge is to maintain a high level of service to the public by answering questions, distributing maps, and producing and distributing spatial data. A significant challenge will be to develop additional course offerings and improved training material for Web LOGIS to help the public to better access and use the County's information resources.

Program Financial Summary	FY 03 Actual	FY 04 Actual	FY 05 Actual	FY 06 Adopted	FY 07 Adopted
Expenditures					
Personnel Operations & Maintenance	\$208,466 41,264	\$217,389 34,781	\$227,722 26,258	\$232,000 30,000	\$254,000 27,000
Total Expenditures:	\$249,730	\$252,170	\$253,980	\$262,000	\$281,000
Revenue					
Local Fees, Charges, Etc	<u>\$62,050</u>	<u>\$62,938</u>	\$83,948	<u>\$71,000</u>	<u>\$69,000</u>
Total Revenues:	\$62,050	\$62,938	\$83,948	\$71,000	\$69,000
Local Tax Funding:	\$187,680	\$189,232	\$170,032	\$191,000	\$212,000
FTE Summary:	3.90	3.90	3.90	3.90	3.10

Mapping & Geographic Information - Public Information Program

Planned Accomplishments/Objectives for FY 07

Goal: Provide access to Loudoun County geospatial data internally at public counters and staff computers to support the daily needs of county government and its citizens.

<u>**Objective:**</u> Facilitate public access to maps and spatial data through the maintenance of public information counter services during all normal business hours.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Requested plotted and copied maps	7,920	16,250	15,000	15,000
Number of data CDs mastered	388	401	400	400
Number of parcel/ address maps produced and distributed	19,801	29,756	20,000	20,700
Overall customer service response rating (scale of 1-5)	5	5	5	5

Goal: Maintain GIS functionality to a level that supports users of the Loudoun County GIS.

<u>Objective:</u> Develop and maintain a training program that provides the users of spatial data the skills necessary to access, understand, and use the data.

Performance Measures	Actual FY 04	Actual FY 05	Est. FY 06	Proj. FY 07
Number of students trained	N/A	57	57	60
Average student evaluation out of seven	N/A	6.62/7	6.62/7	6.63/7